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ABSTRACT

Students can be taught to read Chinese more efficiently and accurately by using the specific capabilities of the right and left hemispheres of the brain. The right hemisphere is the site of image and pattern recognition, and students can be taught to use those capacities to process individual characters efficiently by watching for the element of pictographic representation present in varying degrees in all characters, whether high or low image, and recognizing the patterns of interusage common beween characters. Teachers of Chinese as a second language (CSL) can raise student comprehension of texts by teaching them to use the analytical and sequential recognition capacities of the left hemisphere to process sentences efficiently. Additionally, students need to be reminded of the value of both immediate context and larger cultural contexts for reading comprehension. Segmentation processes in determining Chinese lexical boundaries use the capacities of both hemispheres, but lexical segmentation based on analytical recognition of syntactic structures using left hemisphere capabilities is the more important methodological tool in identifying lexical items. (Author/MSE)

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Right Hemisphere and Left Hemisphere:
Pedagogical Implications for CSL Reading

a paper prepared for the

Chinese Language Teachers Association meeting

Chicago, Illinois

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I. Introduction

The Chinese writing system is one of the features which attract students to the study of the Chinese language. For some the characters are fascinatingly different: they represent a distant people who have a different world view that is approachable through the writing system. Others consider the characters one key to a career in government, business, or education. Chinese language instructors can build on this attraction to develop student ability to read and comprehend written Chinese. Fortunately, the recently renewed scholarly attention given to the psychology and physiology of reading English and reading in a second language can help Chinese language instructors begin to understand the universal processes of both first and second language reading. The studies directly and indirectly suggest pedagogical techniques which we can use to help Chinese as second language (CSL) students become efficient and comprehending readers of Chinese.

The two major areas of research into second language reading at present concern teaching English as a second language and the teaching of European languages to Americans.[1] Not as much has been done with Chinese, but in the last few years there has been a growing number of studies of the mental processes involved in reading Chinese. These studies have so far focused mainly on how native Chinese read and process individual characters, but there also has been some research done on how Chinese read and comprehend larger segments of written Chinese. No studies have been made of CSL student reading processes. While the field is still young and at present not directed towards reading Chinese as a second language, insights into better pedagogical techniques for teaching reading of Chinese can still be gleaned from general studies of reading and research into second language reading. This is obviously desirable in a discipline where students often start out intrigued but scared of the Chinese writing system and subsequently easily become bogged down with the numbers of characters to be learned. The findings of studies on how individual characters are read can help teachers be more effective at the start of student work with written Chinese as well as later on.

More advanced students tend to be overwhelmed with strings of half-remembered or completely unknown characters which seem to occur ever more frequently in sentences of ever increasing length.[2] They

often cannot see the forest for the trees, become frustrated, burn out, and are lost to CSL study. Though the studies are preliminary, research on how English speakers read advanced levels of second language texts in Indo-European languages and how Chinese read their own language can also be of pedagogical assistance to CSL instructors working with more sophisticated texts.

In this paper I will first briefly discuss some of the ideas current in studies of single character reading. My colleague, Professor Teng, discussed beginning character acquisition in the paper we have just heard, so I will here just touch upon some of the studies which have impact on my main concern in this paper, teaching students who are starting the second stage of Chinese language study techniques which they can use throughout their career to read Chinese efficiently and with comprehension.

II. Reading Individual Characters

A problem we immediately face when we introduce the Chinese writing system (CWS) is how to teach students to learn to read and write Chinese characters accurately and efficiently. While the conclusions of studies by Biederman and Tsao (1979), Besner and Coltheart (1979), Hung and Tzeng (1981), and Treimin et al (1981), and others seem obvious and simply common-sensical, they give scientific evidence that there probably are fundamental differences in the processing demands of reading a phonemic writing system such as English and those of reading discrete elements of a morphemic writing system such as Arabic numerals and Chinese or Japanese characters.[3] It appears that the type of orthography used has an effect upon the processing routes used in reading. The selective impairment of ability to read kana and kanji found in Sasanuma's (1971, 1972, 1974a,b,c) studies of Japanese aphasics and Hatta's (1977) experiments in kanji recognition suggest the task demands for reading syllabary and logographic orthographies are also quite different. Park and Arbuckle's (1977) work with Korean readers of Chinese characters and hangul provides further evidence of differential task demands for the processing of a morphemic and syllabic writing system. A logical implication based on all these studies is that reading in the third, phonemic, type of orthographic system involves processing skills different from the other two; a hypothesis supported by the studies So et al did

as discussed in Tzeng (1979). As CSL instructors we need to be not only aware of this, but to define these different processing demands in terms of developing pedagogical techniques which will help our English speaking students learn the kinds of skills necessary to read, process and comprehend Chinese characters efficiently.

At the task level of reading, processing and comprehending base units of the Chinese morphemic writing system, individual characters, the left visual field: right hemisphere of the brain appears to be dominant.[4] If the studies are correct, the fact that the right hemisphere is believed to be used in most human beings for tasks involving pattern recognition and holistic image recognition suggests certain strategies and tactics that teachers of Chinese as a second language can employ with beginning students. First and most simply, since characters map onto the Chinese language at the syllable level, we can teach students to rely on associating exactly one character with exactly one syllable of spoken Chinese and on articulating one syllable for each character when reading out loud.[5] They may also expect to write one character per syllable. They need not worry about developing segmentation skills for units either smaller or larger than a syllable.[6] Whether or not the brain might process morphemic graphs and pictures somewhat differently depending upon the strength or weakness of the image presented by the graph (Park and Arbuckle 1977), given the principle of the picture superiority effect (Paivio 1971), the image recognition capabilities of the right hemisphere of the brain and the pictographic origins of the Chinese writing system suggest a pedagogical strategy of teaching students to analyze critically every Chinese character with the goal of recognizing the object or concept, whether easily identifiable from surface features or opaquely hidden, behind all characters.

In many of the most commonly encountered characters, the grapheme-meaning relationship is still tight.[7] If CSL instructors know and consistently point out the semasiographic concepts behind the originally pictographic and later evolutionary forms of the characters, students soon begin to analyze graphs and understand the patterns of pictographic impulse behind the modern kaishu forms: e.g., the stick figure in 人 < 𠂉, the outline of the mouth in 口 < 𠙵, the mountain in 山 < 𡈼 etc. Other characters for which the grapheme-meaning link is not immediately obvious become so with the teacher's explanations: e.g., 上 <

下く二，女く㚔，or 大く太. With a little bit of graphemic explanation, the holistic image recognition capabilities of the right hemisphere help students learn characters in which the level of pictographic representaion is more abstract: e.g., the crucible and dipper of molten metal in 金く , the foot going out in 出く , or the phonetic borrowing of two people back to back for 北く , or a weapon for 我く . The instructor can also describe overall patterns of evolution of the Chinese writing system and train students to recognize and use these patterns to process characters whose Kaishu forms seem very far removed from any pictographic ancestry: e.g., the image of a tongue and words coming out of a mouth helps students understand the semantic value of "words" or "speech" represented by 言く . Similarly, an accurate explanation of the representation of a cowrie shell as 貝く brings understanding of its semantic function of "money" or "value" in a great number of characters (plus one insight into the origins of Chinese culture.) Many other similar examples can be cited. Students can be trained very early in their work with Chinese to employ the latent capabilities of the right hemisphere, and then apply these analytical techniques to learn to recognize large numbers of characters efficiently. The same pattern recognition skills can also help students correctly recall characters when writing from memory.

This training prepares students to use the patterns of appearances of semantic tags (also called radicals, meaning specifiers, etc.) and phonetic elements which are used over and over again in combining (i.e. 形声字).[8] If students recognize that a pattern of strokes such as , 木 , 日 , etc. are more often than not used to give a particular semantic linkage between the character and the word it represents, and if they are trained to recognize that particular patterns of strokes (e.g. 昜 , 尃 , 类 , etc.) are often used repeatedly for a sometimes specific and sometimes general phonetic value,[9] they can use this knowledge to recognize and process individual characters more efficiently. The goal of this step is for students to see recurrences of elements shared between characters and use the interrelationships of one to the other to recognize more characters more easily. Tzeng's comment (1983 p. 82), that "the only way to master thousands of distinctive characters /is/ through rote

memorization" does not have to apply to CSL learners. Students do not have to rely solely on memorization, they can use the capacities of the right hemisphere for reasonsed and efficient learning. Tzeng further comments that the essential problem of learning to read Chinese is its great number of distinctive characters (1983 p. 83). If properly approached, that they are distinctive rather than alphabetic can be a great plus, not a negative, Our end goal in teaching individual characters should be teaching students to develop the pattern recognition skills of the right hemisphere to recognize the distinctive similarities and differences between the thousands of characters they will have to learn if they are to become fluent readers of Chinese.

Finally, training students how to use this pattern recognition capacity to learn individual characters gives them a foundation of skills important in learning how to recognize the patterns of combining and recombining of the semantic values represented by individual characters to form discrete lexical items. As students sharpen their pattern recognition skills and increasingly become more comfortably accurate at application of this set of skills in reading and recalling individual characters, the CSL instructor can begin introducing techniques which will guide students towards the ultimate goal of being able to read and comprehend any level of written Chinese texts.

III. Syntactic Parsing and Lexical Segmentation

While there are definable, orthographically based differences in the processing routes used at the level of reading discrete elements of the three categories of writing systems, studies suggest that at the higher level of processing lexical items and sentence length syntactical structures, there are certain universal features common to reading, processing, and ultimately comprehending all languages, regardless of the orthography used to represent the language (Hung and Tzeng 1981). Additionally, other studies suggest that second language learners tend to employ some of the particular reading skills characteristic of their first language reading capabilities (Chu-chang 1977). In the remainder of this paper I will discuss some of the pedagogical implications of universal reading procedures

at the higher level of linguistic awareness and how CSL instructors can utilize the fluent English reading habits on our students usually possess to sharpen their ability to read and comprehend Chinese texts. I will also discuss the interrelated question of lexical segmentation in Chinese texts and suggest some methodologies aimed at increasing student skills at recognizing and processing lexical units of the language. Finally, I will consider the methodological question of whether asking students at the start of the second stage of language acquisition to read sentences out loud in class is pedagogically valid or not.

The left hemisphere of the brain is believed to be the processing center for sequential and analytical tasks. Studies of reading processes in English and other Indo-European languages indicate that all reading procedures requiring such tasks take place in the right visual field: left hemisphere; that is, the higher processes of linguistic awareness involving lexical access and syntactic parsing appear to occur here. Hung and Tzeng (1981) argue that these processes for Chinese reading are fundamentally identical to those of English and other languages. Our present understanding of specifically what takes place in the left hemisphere during the course of reading and precisely how it proceeds is still preliminary and any conclusion still tentative, but consideration of the present state of understanding results in clear suggestions for CSL education.

Chinese syntactic structures may be of any length from a single word: e.g., 好 or 对, to those of tens of words (with words usually being represented by two characters. The segmental implications of some lexical items being either shorter or longer than two characters is discussed below.) Fluent, native Chinese readers and more experienced CSL readers can process sentences with very short surface features simply through visual processing routes with no need for phonetic recoding or overt syntactic parsing (Tzeng and Hung 1980, Treiman and Baron 1981.) But as sentences become more complex, processing procedures become more involved.

Kleiman (1975) argues that when mature English language readers read complex sentences, the processes and capabilities of the working memory stage of reading come into play. He hypothesizes that when reading a complex, lengthy sentence or a sentence with multiple centers, or a sentence with both features, the native English reader first visually encodes the textual material, processes for it for

lexical content and moves it into temporary storage. If there is an overload in temporary storage, that is, if the sentence is too lengthy or complex to be processed completely by visual routes, the mature reader employs speech recoding (i.e. resort to the phonetic codes stored in the left hemisphere) to enhance lexical identification and allow additional words to be stored in preparation for implementation of syntactic parsing procedures. While the sentence is considered the natural working unit in the reading process, the finite capacity of the temporary storage facilities can be overloaded even after using phonetic recording if sentences are of excessive length or are complex and have multiple centers. When this happens, comprehension is lowered or perhaps completely stymied, or units smaller than complete sentences are processed. Once the separate units are processed and comprehended, they are moved to long term memory and further units of the sentence are then processed until the whole sentence is recombined, comprehended and placed into long term memory. The contents of the working memory are then purged, the reader moves on to the next sentence and begins the cycle anew.

Syntactic parsing procedures "divide the sentence into its component parts and determine the grammatical function of each part. Combinatorial procedures form composite meanings from the meanings of these component parts." (Kleiman 1975 p. 324) While the exact nature and functioning of the parsing procedures are unknown (p. 336), for an experienced first language reader they function smoothly and without conscious effort, perhaps even automatically. But for CSL readers at the beginning of the seeond stage of language acquisition, conscious control of syntactic structures is generally still shaky, and subconscious abilities probably non-existent. The CSL instructor's job with such students is to give intensive attention to training them how to recognize the syntactic structures of complex Chinese sentences, how to determine if there are multiple centers, how to accurately divide such sentences into manageable units, and how to recombine the units into a comprehensible whole. The storage capacities of the working memory are finite, but they presumably vary from person to person and would seem by nature to be expandable, especially for foreign language learners at the stage of acquisition under discussion here. The end goal of the instructor's efforts should be to nurture

the growth of the working memory storage capacity and the development of automatic syntactic parsing procedures in their students.

To reach this goal, the instructor should develop practical methodologies to heighten student recognition of syntactic structures in the complex and multi-centered sentences they are likely to encounter in reading advanced Chinese language texts.

Tzeng (1980 p. 223) argues that syntactic parsing procedures may be able to function only on phonetic codes, though Kleiman (1975 p. 336) observes that there is no evidence that speech recoding helps with parsing and combinatorial procedures. For a native reader or highly experienced second language reader, phonetic codes may be of help in processing, but CSL students are frequently weaker in the phonetic aspects of their language study and more visually oriented at this stage of their work with Chinese. If they are subsequently able to develop stronger oral-aural skills through in country study or otherwise, use of phonetic recoding, whether it functions at the stage of expanding temporary storage capacity as Kleiman argues or in activating parsing procedures as Tzeng maintains, can only reinforce

and enhance their reading ability. For the bulk of our third year students though, the primary pedagogical approach should be one stressing analytical awareness of the basic structures of written, modern vernacular Chinese.[10] The end goal of such an approach is to build a foundation for automatic syntactic parsing procedures which CSL learners can use later.

The above suggests a methodological approach utilizing the sequential and analytical capabilities of the left hemisphere of the human brain to train students to read and comprehend Chinese texts. At the end of two years of study they know the basic grammatical patterns of the language and that Chinese does not require the morphological markers for grammatical function that English does. They are generally aware that as an isolating language Chinese marks syntactic function by the position assigned to words and grammatical particles, but students at this stage tend to overlook the utility this knowledge has for recognizing and understanding the syntax of complex sentences.

One first step the CSL instructor should take is to strengthen and develop further student ability to analyze and accurately recognize the basic syntactic structure in complex but single centered sentences by stressing the utility grammatical awareness has for reading and comprehension. In the following I will discuss some specific methodological techniques which can be used to inculcate syntactic awareness and build syntactic parsing abilities in CSL students. For example, in a sentence such as

1.尼克松的否决在国会议员中引起了强烈的反响。 VII.21.B.4[11]

students should be trained to first scan the sentence looking for the basic syntactic structure. They should be instructed that the STPVO base form is most common and to expect that while also watching for the appearance of words such as 是, 比, 离, 一样, etc.[12] which are indicative of other specific syntactic structures. In sentences such as #1 students should recognize the 的, 在...中 and 了 elements as basic grammatical markers. They need to understand that 的 indicates noun modification and that if it occurs towards the head of the sentence the noun after it will probably be the subject, unless it is the topic of a topic-comment structure--a structure which is statistically less common but readily identifiable. If the noun after the 的 comes towards the end or at the end of the sentence it is

I discuss multiple centered modification below while considering multiple centered sentences.

without question the object of the sentence. Students should be alert to the possibility of multiple subjects or objects, but these structures are generally marked by 和, 跟, 以及 etc. and or by one or more enumerative commas. In this sentence they should recognize that the single noun subject is marked by 的, is towards the sentence head, and is readily identifiable since it is located directly before 在, the marker for the next syntactic element in this sentence.

The appearance of 在 should lead students to expect a place element in the sentence. But even when they do understand the function 在 has in introducing the place structure, students often have difficulty determining the end boundaries of the place element until they understand the function of markers such as 上, 中, 里, 方面, etc. in marking the end of the place element. Once clear about the function of such markers, they can accurately comprehend the parameters of place even if it is something as lengthy and complicated as ...在研究和治疗癌症、心血管疾病方面... I.2.A.17.

在 and other place markers are sometimes used to introduce and emphasize a time element, but by their ontological nature, time elements are the easiest of all syntactic structures to recognize in a sentence, and students generally have no confusion in distinguishing between time and place elements, even if both can be introduced by 在. If the place element is sentence initial, the 在 may be deleted, but if students remember that one of the markers mentioned above will be used to mark the end of the place structure, they will still be able to identify the place structure. Students expecting the subject to be in sentence initial position may be confused at first when the place element starts a sentence, but awareness of the function of place end markers will clear up any uncertainty. In sentence #1 the place element is relatively simple and the student can readily identify it by locating the markers 在 and 中. Our goal in teaching students to look at sentences in this analytical manner is to strengthen their syntactic parsing procedures on the surface level with the hope and expectation of such procedures becoming automatic in their CSL reading processes as they work further with the language.

By keeping the student rigorously aware that STPVO is a base form with some specific variants, they will be able to comprehend the possibility of the place element occuring after the verb to indicate the location of the result of the verb action. This type of sentence structure is statistically less frequent than those with the place element before the verb, but once again the appearance of 在 or other place markers should alert the student to the appearance of a place element whether before or after the verb. What place markers should be considered linguistically is an interesting question, but of little pedagogical help for students at this stage of reading. My concern is to have them realize that with the exception of lexical items such as 在先, 现在, 存在, etc. they can rely on the appearance of the place markers to indicate the place structure in Chinese sentences. If this basic principle is clear, they can also use other place markers such as 从, 往, 向, etc. to determine the existence of place in a sentence. If after reading and comprehending the sentence, students are asked to translate it into English, the CSL instructor should emphasize the contrastive difference in the syntactic position of place in English and Chinese. Since place comes at the end of English sentences, students should be trained to recognize the place element in the Chinese sentence and then hold it in their minds until the English equivalent for the rest of the sentence has been generated and then give the English equivalent for the Chinese place element.

The heart of a sentence is the verb, and truly efficient and accurate processing depends upon being able to identify the verb. Since very few sentences occur without a verb, and then only in unique contexts, we can instruct students to expect the presence of a verb in a sentence even if any or all of the other syntactic elements may be absent. (That virtually all sentences require a verb has important pedagogical implications for training students how to recognize and process multi-centered sentences, as I discuss later.) Analytical recognition of the verb can be enhanced if students understand the syntactic position in which Chinese verbs must occur. Additionally, if the recognize that markers such as 过, 着, 完, 成, 到, etc. are invariably found in post-verb

position when used in complex sentences, they can easily locate the verb through them, even if the students do not recognize the verb as a lexical item. That is, they should know that the verb occurs directly before 了, 为, etc. markers as it does in sentence #1. Besides using this knowledge to pinpoint the location of the verb, which is basic to recognizing the syntactic structure of a sentence, another value of knowing the syntactically required position for verbs is that if students see an unknown word in a verb position, say for example 组织 and look it up in a dictionary, they will translate it as a verb whether it is given the equivalent English value of "organization" or "organize" in the dictionary. Conversely, if students are aware that by being the focus of modification and coming directly after a 的 a lexical item must be a noun, they will understand lexical items such as 革命 with a noun value even though their dictionary might renderit as either a verb, or as a noun, or something else.

Students must be aware that because adverbs can be placed directly before verbs, they are also useful in locating the verb, but that they require more syntactic sensitivity since they can also be found directly before markers for place and time. Once aware of these two possibilities as well as understanding that moveable adverbs can also be sentence initial, students can rely on this knowledge as another analytical procedure for determining the verb center of a sentence (or units of multiple centered sentences as described below.) If students see words such as 也, 就, 还, 已经, etc. in a sentence before a place marker, they may be certain that the verb will come after the place element. This argument of course depends upon student ability to determine the parameters of a place element in the manner described above. The CSL instructor must make clear to the students that if there is no place element following an adverb, the verb must come directly after the adverb. The adverbial marker 地 is also very helpful for indicating verb position when it occurs, though it is not always used to mark adverbs: e.g. 逐步 can occur with or without 地 with no change in syntactic function. Students should be trained to focus on 地 when it occurs and expect the verb to follow directly after it, but not to be confused when an adverb appears without it.

Once the verb has been pinpointed, locating the object in the STPVO base form should be automatic--the object will come after the verb. Students must realize that if single centered, the object will be the last noun, or nouns if in a co-ordinate or serial construction, in the sentence. No matter how lightly or heavily modified, it will be in the sentence final position and marked by 的. Co-ordinate or serial objects will be marked by enumerative commas and or by co-ordinate markers such as 和, 以及 etc. If the object in a complex sentence is itself a complex syntactic structure, it too must observe the rules of syntactic ordering seen for full sentences and will be parsable through the analytic methods described for sentences. If the writer uses the 把 construction to move the object directly before the verb, students can use the appearance of 把 to locate both the object and the verb if they know that 把 is used only in a STP 把 OV (O) form. In sentence #1 the object is sentence final, marked by 的 and modified by a single word. Students should recognize this sentence has a SPVO structure and process it accordingly.

Students must also be aware that modification of subjects and objects must be organized according to the basic syntactic rules of the language and that this modification must be marked by a 的 directly before the modified noun. In a sentence as complex as #2 戴蒙德夫人在会上把斯诺夫人在斯诺逝世后整理出版的遗作《置于的革命》赠给中国客人作为纪念。XII.34.A.26 they should use the 在…上 structure to identify the place element and use their understanding of fundamental syntactic organization to know that what comes before the place element will either be the subject, time, or both. The 把 marker tells the student that the object has been placed before the verb, and that if the object is modified the object will be the noun directly after the 的 just before the verb. They must also keep in mind the possibility that if the object is modified by more than one center of modification, it will be the noun which comes after the final 的 before the verb. Initial student reaction to #2 is usually to see Mme. Snow as the object of 把, but when reminded of the function of the 的 modification marker and the rule that syntactic ordering must also be followed in modification structures, they see that the posthumous work is the object and that it is modified by the syntactic structure STVV. The syntactically required position of the verb after the

object plus the appearance of the post-verb markers 结 and 为 indicate the main verbs in this sentence. The point of guiding students through such sentences is of course to develop their syntactic parsing skills in more and more complex sentences.

The verb 是 is the distinctive marker for the second most frequently encountered basic sentence sturcture in Chinese, X是Y. Students should be trained to recognize that if 是 (as always, excepting lexical items such as 还是, 但是, etc.) occurs in a sentence, the syntactic structure will be one wherein the portion before the 是 equates to the portion after it. Both portions may be a simple noun, part or all of a STPVO structure, or another syntactic structure. The second portion may have the same syntactic structure as the first, or it may be completely different. Regardless of how simple or complex either portion may be, if students recognize the 是 verb, the basic syntax of the sentence will be seen. The next processing step is to utilize the syntactic parsing procedures described above to analyze and process the first portion and then the second portion and then combine them for a comrephended whole. For example in the sentence

#3 老员的医疗费用也是老年人的一项沉重负担。 XVI.53.C.23

students should identify the 是 syntactic marker when first reading the sentence; the appearance of the adverb 也 helps pinpoint the verb as 是. To process a 是 based syntactic structure the student should concentrate on identifying the syntactic structures preceeding and following 是. In this sentence, the 的 modification marker triggers understanding that noun modification is occuring and recognition of a V 的 N structure for the first part of the sentence. Implementation of the same parsing procedures in the second half nets a syntactic structure of N 的 N. Combinatorial procedures result in the student processing and comprehending a V 的 N adv 是 N 的 N structure.

More complex but still single centered 是 sentences should be processed in the same manner. In

#4 这种上涨的最大部分是由于食品价格的不断提高。 VI.18.A.13

the syntactic structure of the first half is marked by 的. The second half has a noun modified by a conjunction marker and noun structure. In this sentence syntactic parsing is useful in forcing students to understand the two lexical items 不断 and 提高 which usually function as an adverb and verb are an adjective and a noun since the students

must process them in terms of their position after a 的 . Stressing syntactic awareness will also guide the students towards understanding 矛中 as a measure and avoid the inefficiency of trying to decide the semantic value it has in this sentence from among the six possibilities offered in the dictionary.

More and more complex 是 base form sentences could be quoted, but analytical procedures leading to efficient syntactic parsing would be methodologically the same as those already discussed. Even in sentences such as #5 where a 是...的 structure is used to mark a sentence as being past tense, passive, with a definite subject and having emphasis on the structure between the 是 and final 的 (as defined by DeFrancis 1976 p. 268), this analytical approach can heighten syntactic parsing efficiency by focusing the reader's analytic attention on the 是 marker.

#5 众议院的法案是以二百三十五票对一百七十二票的多数通过的。 VII.21.A.6

The goal of developing skills for analyzing the surface syntactic structure of complex sentences is to make the skills automatic and allow the CSL reader in the end to concentrate on the contents rather than the structure of texts.

Training students to read and comprehend multiple centered sentences can proceed in basically the same manner as that for complex sentence if we keep in mind Kleiman's thesis that when temporary storage facilities are overloaded, units smaller than complete sentences are processed. This hypothesis suggests that we teach students to look at multi-centered sentences with an eye towards breaking the sentences into processable constituent units. Students should be instructed how to make use of internal clues to analyze a sentence into units which can be processed, stored and then recombined to form a comprehended whole.

In addition to syntactic structures and markers, punctuation can be a suitable analytical tool if English readers understand the manner in which Ch inese use it. Periods, questions marks, and exclamation marks are used to mark the end boundaries of sentences, though sometimes single sentences with multiple centers in written Chinese should be divided into separate sentences if translating into English. Colons, dashes and semicolons are used in much the

same manner as they are in English and can prove to be highly useful tools for determining syntactic units in lengthy, multi-centered sentences. The comma is the Chinese punctuation feature which gives English readers the greatest difficulty. The reason for this can be seen in the explanation one of the most popular dictionaries for CSL students, A Concise Chinese-English Dictionary 简明汉英词典, gives for the usage of a comma in Chinese, "indicates a pause within a sentence." (p. 783) For American students rigorously trained by years of English classes to use commas to separate main clauses, introductory clauses and the like, it can be very confusing to see commas used to separate the subject from the verb, or to set off the time or place element in a sentence. The CSL instructor must constantly alert students to potential problems caused by this different usage and tell them repeatedly of the differences involved. On the other hand, punctuation features which do not exist in English can be very handy tools for syntactic understanding. Correct perception of the enumerative comma leads to more efficient parsing of strings of items roughly equivalent in grammatical value. The use of different symbols to indicate the names of people and written works, and of a period raised to mid-level in the sentence to separate units of time and lengthy foreign names are also helpful in reading Chinese if correctly understood.

The major difficulty students face in processing multiple centered sentences is to know where to break the sentence into syntactically parasable units. CSL instructors should train them to make use of the same procedures they use to recognize syntactic structures in complex sentences and at the same time use the clues provided by Chinese punctuation practices to develop an accurate ability to recognize processable constituent units within sentences with multiple centers. For example in

#6 这一次他在中国访问了北京、延安、上海和广州等城市，了解了中国人民经历的苦难和斗争，分享了中国人民今天的欢乐。

XII.35.A.10

students should be told to determine first if the units suggested by the commas are syntactically parsable separate constituent units. That is, they should use their parsing skills developed in working with complex sentences to determine whether or not the word string set off by the comma has the verb center required to form a

constituent unit. Looking at the first punctuation suggested unit, they should focus on the markers 在 and 了 and determine the existence of at least a place element and a verb. Using that they should then determine that there is a time and subject preceeding them and that an object follows the verb. If they understand the function of the enumerative commas and the marker 和 they will see that there is a co-ordinate object structure in the first unit. Since the first comma demarcated unit has a TSPV syntactic structure, it is a syntactically parsable constituent unit within the sentence. The third character of the next unit is the post-verb marker 了 which should indicate to the students the probability of a VO syntactic unit. The 的 modification marker and the 和 marker tell the student that this unit has a co-ordinate object with modification. Analysis of the modification structure should result in recognition of a SV structure. Students should understand this as a VSV的O和 constituent. The third unit has a similar structure with syntactic function markers to guide student parsing. They should analyze the whole sentence as having the constituent units TSPV co-ordinate O, VSV 的 co-ordinate O, VST 的 O and then use combinatorial procedures to recombine the units into a comprehended whole, and then move it into long term memory for reference in understanding the text as a whole.

Students must be made aware that the Chinese use of a comma to indicate a pause within a sentence rather than the English practice of using commas to separate syntactic structures may mean that a comma may separate a subject from the verb, the place or time element from the rest of the sentence, or even separate the object from the verb. When this usage is combined with Kleiman's hypothesis that parsing of sentence units proceeds until a constituent is formed (p. 336), and if a verb is the one element that is syntactically required in constituent structures, the pedagogical implication is that if students cannot identify a constituent unit within a comma demarcated section, they should go on to the next unit and analyze that for the verb. In the sentence

#7 去年春季，当中国乒乓球代表团参观底特律的一家汽车工厂时，正在装配线上紧张劳动的工人，面带笑容向中国运动员伸出了热情的欢迎之手。 XIII.40.A.6

the first comma sets off an easily identifiable time element. The next element ends with 时 which should tell the students that a

time clause appears and that they should syntactically parse that unit. Using the marker 的 and the expectation of a STPVO form results in students processing and putting into working memory storage a T,SV noun 的 O constituent unit for the 时 clause. Looking at the next comma suggested unit, if students see that the word 劳动 comes directly before a 的 they will realize that 劳动 modifies a noun and therefore cannot be the verb center of this unit and that they must look for the verb after the comma. Doing so they see an adverb before a place marker followed by the verb. That 伸出 is the verb center is further indicated by the post-verb marker 了. The object follows the verb in sentence final position. The student should analyze and understand this sentence unit as S,advPVO constituent unit with further modification of S and O. The unit is then processed for comprehension, combined with the previous unit, comprehended as a whole and then placed in long term memory. The sentence is then purged from the working memory and a new sentence entered.

Other clues for division of multiple centered sentences into processable units are given by lexical items which mark the division of a sentence into two or more centers. For example, when students encounter 虽然 towards the head of a sentence, they should be alert to the presence of at least two centers, both of which are syntactically discrete units, with the second center possibly being marked by a lexical item such as 可是 or a synonym. Once aware of this, students can then attempt to parse the first unit using the analytical techniques discussed above, and then procede to the next unit after comprehension is achieved in the first. If this procedure is followed, the student will not be overwhelmed by the length or complexity of the sentence, but instead process it with expectations of comprehension. Other lexical items which function in an analogous manner are 因为X,所以Y; 如果X, 就Y; 不但X, 而且Y, etc. Items such as 才, 却, 不过, etc. occur in later units of sentences, and their appearance should alert students to the likelihood of at least two syntactically discrete sentence units. An example of this type of sentence is

#8 中美两国虽然远隔重洋,相距万里,但是地理上的遥远阻隔阻止不了两国人民发展友好往来的愿望。

XIII.40.A.29

Kleiman does not give consideration to anything larger than a sentence, but it is pedagogically effective to be continually reminding students to remember contexts when reading. If they are having difficulty processing the syntactic structures or comprehending the meaning of what they have read, it is useful for students to place the problem area in context by reviewing what they processed immediately before and skimming the following sentence or two for structure and content. To promote an awareness of the value of context in processing and comprehension, students should be instructed to read quickly through the entire text they are working with before beginning to focus their efforts on any one sentence. This helps students develop guessing strategies which allow them to have an idea of what may be going to be said and use that to help understand what is being said. Guessing can be very helpful if it is intelligent, structured guessing.

Cultural Context is also an important aid to reading comprehension. Students will find The True Story of Ah Q easier to understand if they have some knowledge of the history of China earlier in this century. Knowing how communists feel towards landlords places the sentences of a story such as The White Haired Girl in a vivid cultural context which aids in comprehension. And cultural knowledge makes the reading more fun. Students begin to look at stories with new eyes and enthusiasm when you ask them (in Chinese of course) what the three horses in The Direction is Wrong (ECR 55.2) represent, who the old man by the side of the road is and why incorrectly going north rather than incorrectly going east, west or south is culturally significant. Students should be urged to take as many history, political science, religion and like courses as they can, it makes the reading easier, and more meaningful.

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III. B Lexical Segmentation

I chose to discuss the processing of lexical items, specifically the segmentation process, after a discussion of syntactic parsing, even though lexical accession occurs earlier in reading procedures. I did so to highlight and underline the fundamental importance of student understanding and control of the syntactic rules of Chinese not only to sentence comprehension, but also to lexical processing. Tzeng (1977 p. 629) is absolutely correct in warning against equating lexical readout to reading. If students are too concerned with

characters and lexical recognition, syntactic parsing procedures will have no chance to take effect, and comprehension will suffer. The trees can overwhelm the forest.

The skills needed to correctly segment lexical items in Chinese texts are quite different from those required for English. This is primarily a reflection of the orthographic systems of the two languages. English combines the base units of the writing system, individual letters, and groups them orthographically at the word level with only a few exceptions. The base units of the Chinese writing system, characters, represent morphemes and individually may or may not represent a distinct lexical item. Chinese words are usually bisyllabic and thus represented by two characters though there are monosyllabic and trisyllaabic words. Words are not written in a connected manner as they are in English, but rather each character is placed equidistant from each other. The job students face is learning how to segment and group the morphemic characters according to lexical function.

As illustrated in the discussion above on reading procedures for sentences, an understanding of Chinese syntactic structures is important to developing a skill at lexical segmentation. An accurate understanding of the basic grammatical patterns such as STPVO, X是Y, etc. brings student awareness of the probable location of lexical items in a sentence string. If an item appears after a 的 and is followed by an adverb or verb, the chances are it is a noun whether it is represented by one character (e.g. 人), or two (e.g. 男人), or three (e.g. 中国人). If an item occurs before 了, 过, 着, or other verb complements or after an adverb, it is probably a verb whether represented by one character (e.g. 想), two (e.g. 命令), or more. As mentioned above in discussion of sentences #2 and #4, awareness of syntactic function allows students to know whether or not to process an item as a noun, verb, adjective, or whatever. If students understand the syntactic functions in sentences such as these, there should be no difficulty in segmenting for lexical boundaries, and there should be no hesitation in identifying words syntactically as nouns, verbs, etc., which will be of help in semantic identification.

When two or more lexical items occur together without any syntactic markers intervening, students should analyze them for a syntactic relationship: e.g. 不断探索 in #5. If such an analysis is co-ordinated with an expectation that the lexical item will probably be represented

by two characters, strings of six or even more characters can also be lexically identified: e.g. 遵作《漫长的革命》 in #2.

Guiding students towards reliable recognition of the semantic values of lexical items is an interesting pedagogical question. It involves many of the pattern recognition skills of the right-hemisphere which are valuable in processing individual characters and also involves the sequential analytical capabilities of the left hemisphere. However, as intriguing and pedagogically valuable as it is, this question does not lie within the concerns of this paper, and I will not discuss it here.

IV Summary

Students can be taught to read Chinese more efficiently and accurately by using the specific capabilities of the right and left hemispheres of the human brain. The right hemisphere is the site of image and pattern recognition, and students can be taught to use those capacities to process individual characters efficiently by watching for the element of pictographic representation present in varying degrees in all characters, whether of high or low image, and recognizing the patterns of inter usage common between characters. CSL instructors can raise student comprehension of texts by teaching them to use the analytical and sequential recognition capacities of the left hemisphere to process sentences efficiently. Students must be taught to recognize the syntactic structures of sentences and use that as a base for reading processes. Whether reading complex or multi-centered sentences, if students process them analytically, comprehension rates will grow. Additionally, students need to be reminded of the value contexts have for reading comprehension. Consideration of both the immediate textual contexts and the larger cultural contexts of a piece of writing aids in comprehension. Segmentation processes in determining lexical boundaries of Chinese words make use of the capacities of both hemispheres, but lexical segmentation based on analytical recognition of syntactic structures utilizing left hemisphere capabilities is the more important methodological tool in identifying lexical items. If CSL instructors teach students to use the capacities of their brains to read Chinese, they will be more efficient and comprehending readers.

FOOTNOTES

1. See "References and Select Bibliography on Reading, "System, 9 (1981), pp. 275-85.

2. Discouragingly lengthy sentences occur even in textbooks. See, for example, the 117 character sentence in the first paragraph of the first lesson of Business Chinese (Stanford U.P. 1984), a text aimed at those "who have at least two years of solid basic training in the Chinese language." This sentence is followed later in the same lesson by sentences of 142 and 165 characters. Sentences of 40 or 50 characters are numerous.

3. A recent summary of the studies is found in Tzeng and Wang 1983.

4. This right-hemisphere dominance is task-specific rather than orthographic-specific. That Chinese and Japanese characters are processed here is a factor of their pictographic elements and the nature of right hemisphere capabilities. The three stage model Van and Zian (1962) describe for acquisition of individual characters by Chinese children in elementary schools supports a right-hemisphere dominance at the elementary stage of learning to read and write discrete characters.

5. The Beijing 儿 is the exception here, but it is infrequent in written texts. Ellipitcal forms such as 开 are so infrequently encountered as to be inconsequential for this discussion. The non-indicativeness of syntactic function of characters is two edged. It simplifies recognition of the semantic values represented by the character, but it leads to confusion and frustration if the students are not rigorously made aware of the syntactic characteristics of an isolating language.

6. Developing the ability to segment strings of characters into discrete lexical items is a different concern, and one which I will discuss later in this study.

7. Tzeng (1977 p. 222) says the opposite "...the relation between the script and the idea is generally quite arbitrary..."

8. The Tzeng et al finding (1978 p. 294) that the combining characters are also first processed in the right hemisphere supports this pedagogical approach.

9. One study states that the phonetics can be useful about 39% of the time in recognizing the pronunciation of a character (Zhou 1979). The study was done with high frequency, beginning level vocabulary. The percentage of phonetic reliability increases as the student works with more sophisticated vocabulary. See the study by Captain Astor 1970. Tzeng's study (1980 p. 225) in which Chinese readers more easily identified characters containing phonetic clues suggests that mature Chinese readers make use of phonetic clues when they are available.

10. This definitely is not to argue against the use of spoken putonghua while working with readings. In fact spoken Chinese should be used at all possible points in discussing sentences. Tzeng et al (1978 p. 296) argue that "phonetic recoding is a necessary stage towards reading comprehension for beginning readers." Reading the sentences out loud and speaking in Chinese will help comprehension, even if only to a minimal degree, and doing so will strengthen the Chinese language phonetic code in the student minds. This will be of help to students towards the end of the third year and later when they have gained control of reading processes closer to the automatic nature of those of their own language. There are several studies which demonstrate that advanced readers of Chinese make use of phonetic recording, especially when texts become more complex (Tzeng and Hung 1977, Chu-chang and Loritz 1977, etc.)

11. Since Vivian Hsü's Readings from the People's Daily is a widely used textbook, for ease of reference sentences quoted in this paper are taken from it. VII.B.4 means the sentence may be found in lesson 7, column B, line 4.

12. Lexical items such as还是，但是，离婚，离开，比较，比赛 , etc. are complicating factors about which we must make students rigorously aware to avoid confusion, but they are also analytically useful in their own ways.